

Road Traffic Accident Analysis on NH-6 of Amravati City (Maharashtra)

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Abstract - Road traffic accidents are increasing rapidly in India with the increase in traffic density. An Accident is the result of a combination of factors such as road defects, human error, engineering defects of the vehicle, non-availability of pedestrian facility, cyclist facility, circumstantial factors such as weather condition, visibility etc. Accident causes death, disablement, damage to property and health, social suffering and also general degradation of the environment. A case study was taken on NH-6 of Amravati district in Maharashtra state. The annual, monthly, hourly variation of accident rate on the road and vehicles involved in fatalities have been presented in paper. The safety deficiencies were detected to minimize accidents on road and save the road users.

Keywords: Accidents, Fatalities, Road Safety.

1. INTRODUCTION

Accident Severity has been increasing rapidly year by year. Road transport is an important mode of transportation in India. Road transport system has its contribution in national economy of India. There is expansion in motorization, urbanization, number of vehicles and length of the road networks over the years, so as to meet the demands of road transport. The adverse effect of this expansion on country is that, it leads to increase in number of road accidents and road crash fatalities. A Road accident is negative externality associated with expansion in road network, urbanization and motorization in the country. Road accidents impose a great burden on individuals, society and property. The steep growth of traffic on the Indian roads in recent years has caused a sharp increase in the incidence of traffic accidents. As sustainable solutions for all classes of road safety have not been identified, particularly remote roads and low-traffic rural, a hierarchy of control should be applied, similar to classifications used to improve occupational safety and health.

2. OBJECTIVES OF STUDY

The specific objectives of this study are:

- 1) To study the annual variation of accident rate on selected stretch of two-lane road.

- 2) To study the monthly variation of accident rate.
- 3) To study the hourly variation of accident rate.
- 4) To find the rate of vehicles involved in fatalities.

3. DATA COLLECTION AND STUDY STRETCH

The information available for accident studies is the FIR (First Information Report) lodged in the police stations. The data from these records of last eleven years (2007-2017) were extracted from the FIR record filed under IPCno.279/337/338/304 (A). Vehicles those involved in accidents and reported in the F.I.R with the details of accident. The categories of vehicles include tempo, auto, and different types of two-wheelers, cars, mini-truck, minibus, motor cycle, tanker, truck and bus.

The following data was collected:

1. Date and Time of occurrence of accidents
2. Location of accident.
3. Details of accident i.e. injuries, fatalities and property damage.
4. Type of Hitting Vehicle
5. Type of Hitten Vehicle

3.1 Road selected for study

Two-lane road of about 20 Km from hotel Gauri Inn to hotel Landmark Badnera on NH-6 was chosen for this study. The road was divided into four stretches of 5 Km each. The following stretches were selected for data collection.

(i) Stretch 1 - Hotel Gauri Inn to Biyani Square

(ii) Stretch 2 - Biyani Square to Dastur nagar

(iii) Stretch 3 - Dastur nagar to Annex Restaurant

(iv) Stretch 4 - Annex Restaurant to Hotel Landmark Badnera

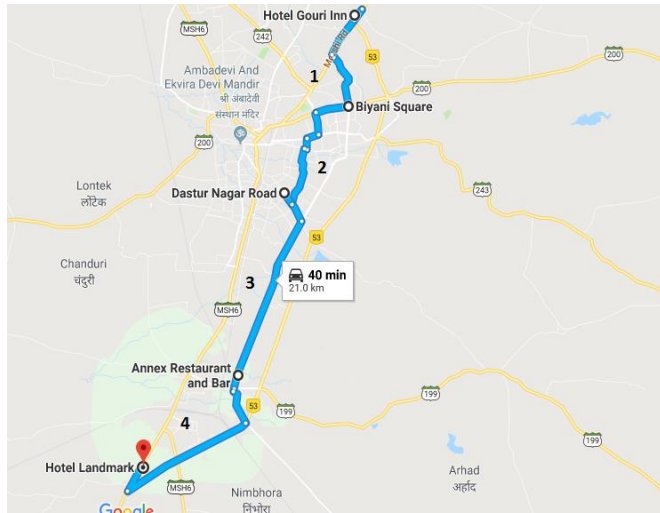


Fig. 1 Study area source: Google Map

Dastur nagar to Annex Restaurant	5km	73	14.6
Annex Restaurant to Hotel Landmark Badnera	5km	120	24

Table 3 Frequency of Accident

Distance of origin	No of accidents (2007-2017)	Frequency	Total frequency
0-5	21	06.6	06.6
6-10	103	32.5	39.1
11-15	73	23	62.1
16-20	120	37.9	100
Total	317	100	

Accident details during 2007-2017 on this road section are shown in Table 1. Accident data were collected year wise from each police station records and then sorted out month wise.

Table 1 Details of accidents

Year	Fatal	Major injury	Minor injury
2007	9	9	22
2008	8	14	24
2009	2	1	40
2010	2	15	20
2011	12	14	50
2012	7	2	28
2013	4	5	30
2014	3	12	36
2015	3	6	38
2016	8	12	36
2017	7	5	39

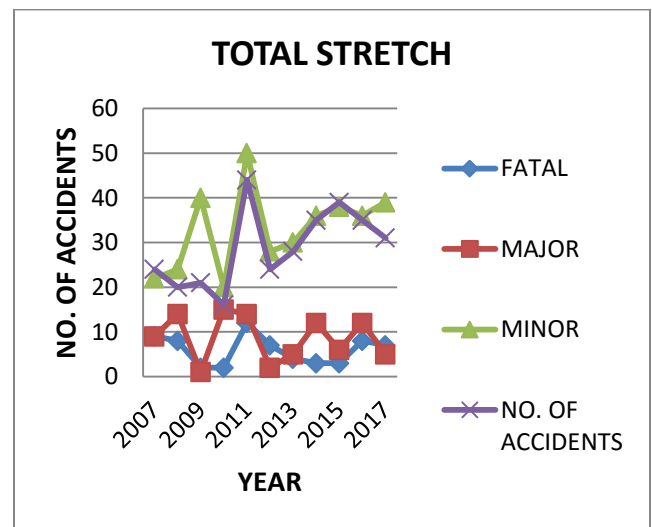


Fig. 2 Annual variation in accidents of total stretch

4. ANALYSIS OF DATA AND DISCUSSION

4.1 Accident Rate and Frequency

$$\text{Accident Rate} = M / L$$

Where M = Total no of Accidents of on stretch.

L = Road Length.

Table 2 Accident Rate

Name of stretch	Length	No. of accidents in a year	
		Sum of 11 year	Accident rate
Hotel Gauri Inn to Biyani Square	5 km	21	4.2
Biyani Square to Dastur nagar	5km	103	20.6

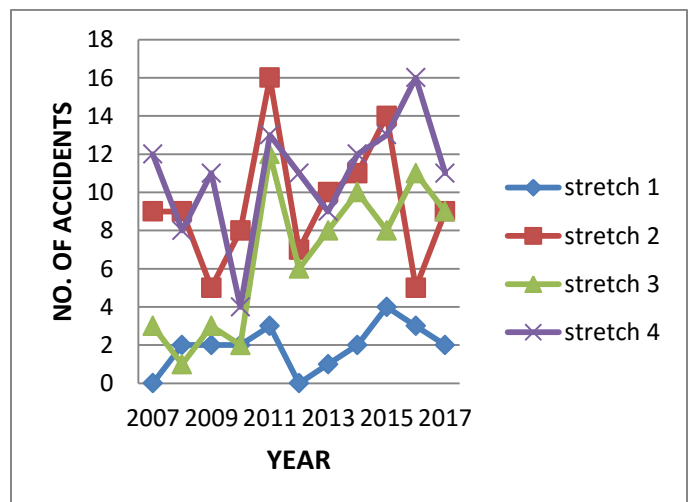


Fig. 3 Annual variation in accidents of four stretches

4.2 Annual Variation in Accidents

Fig.2 shows the annual variation in accidents of total stretches during year 2007-2017. It is observed that percentage accidents are increasing in most of the year. In the year 2017 accident rate was high and low in the year 2007. It may be due to increase in no of vehicles, increase in population, bad traffic environment.

Fig.3 shows annual variation in accidents of the four stretches. It is observed that no of accidents are more for stretch-2 and 4 are more higher than stretch -1 and 3. This is because of high traffic volume on stretch 4. Traffic volume decreases on stretch-1 as it is connected to NH-6. Stretch-2 has high population density. Accident rate is more due to more number of noncommercial and commercial vehicles on the road, bad traffic environment.

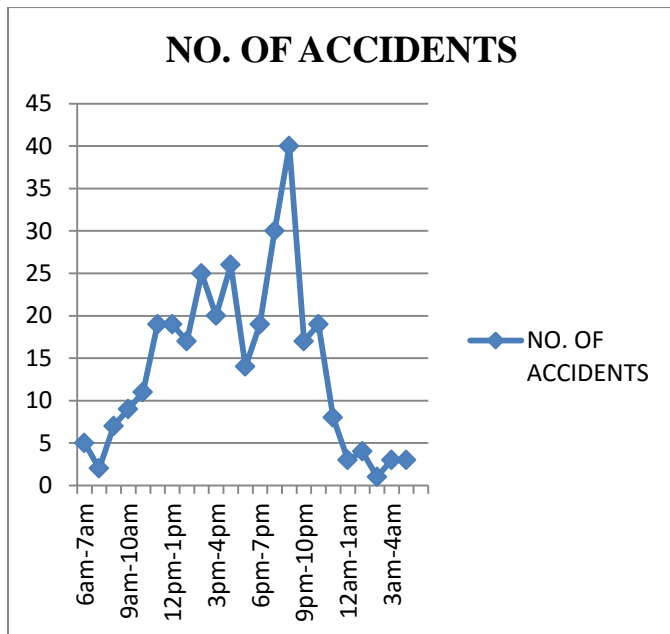


Fig.4 Accidents time wise (2007-2017)

4.3 Hourly Variation in Accidents

Fig.4 shows hourly variation in accidents. One can observe more accidents occurs in between 7PM to 9PM. During this hour line truck (Truck Series) start their long journey. Most of the driver do not use speedometer as they drive by approximate speed, then speed crosses limiting speed as a result accident occur. Also drivers drink and drive in the evening hour. Accident also occurs due to overloading of vehicles. In India load capacity is 10 ton or 16.2 ton for goods carriage but they carry more loads that results uncontrol and lead to accidents.

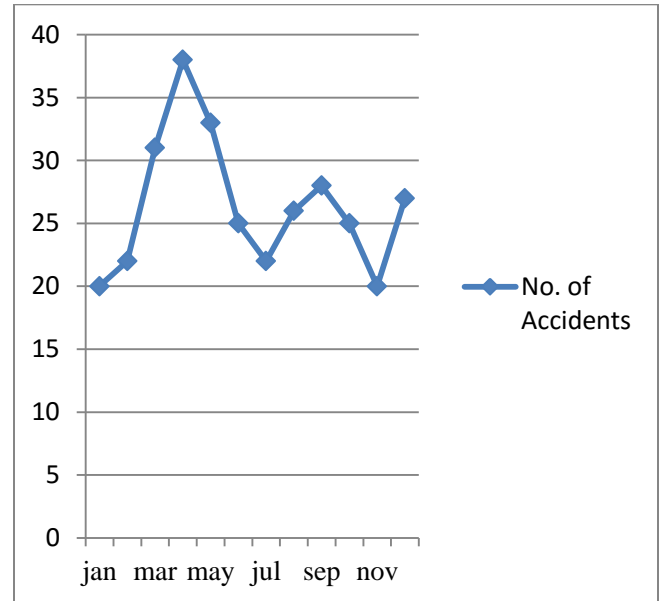


Fig.5 Accident month wise (2007-2017)

4.4 Monthly Variation in Accidents

Fig.5 shows the monthly variation in accidents. Maximum number of accident occurs in summer season i.e. in the month of March, April and May. This is due to distraction related to environment. Problem in these months are fatigue, glare, inconvenient heat.

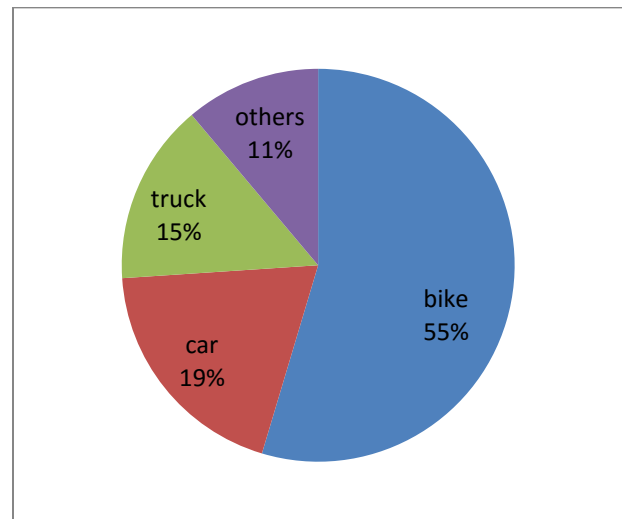


Fig. 6 Vehicles involved in accidents during 2007-2017

4.5 Vehicles Involved in Fatalities

Vehicle users related to fatalities during 2007-2017 are shown in pie chart fig.6 in percent form. The results indicate that 55 percent of fatalities are due to motor cycle followed by 19 percent by car, 15 percent by truck followed by 11 percent unknown respectively as shown in fig.4.18.drivers

consume alcohol during driving, as a result reaction time increases and loss of control occurs during speed driving leads to fatalities.

5. CONCLUSIONS

- 1) It is estimated that fatalities caused by bike is 55 %, truck (15%), car (19%) and by others (11%) .Road safety awareness should be raised among road user to reduce accident rates.
- 2) Maximum number of accident occurs in summer season i.e. in the month of March, April and May. This is due to distraction related to environment. Problem in these months are fatigue, glare, inconvenient heat.
- 3) Stretch 4 has the highest number of accidents which accounts for 37.9% of total accidents.
- 4) Stretch 2 have the second highest number of accidents which accounts for 32.5% of total accident.
- 5) Number of accidents on stretch 3 accounts 23% of total accidents..
- 6) Accidents can be minimized by clearing-off shoulders, reducing speed limit, junction improvement, providing the medians, improving road condition

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